

CLAIMS

1. (Currently amended) A resin formulation useful for forming pellets as precursors to shaped articles and/or molded snacks, comprising:
a shelf-stabilizing agent ~~including~~ comprising a hydrolyzed protein moiety, said hydrolyzed protein moiety being and selected from the group consisting of hydrolyzed protein and hydrolyzed protein derivatives,
the said shelf stabilizing agent being present in an amount ranging from 0.5% to 25% by weight of the resin formulation; and
grain protein ranging from 20% to 80% by weight of the resin formulation, wherein the grain protein in the pellets is substantially undenatured by heat.
2. (Previously Presented) The resin formulation of Claim 1, wherein the pellets are melted and shaped into one of an edible product and a biodegradable product according to a process that includes at least one step of injection molding the resin formulation or extruding the resin formulation.
3. (Previously Presented) The resin formulation of Claim 1, wherein the pellets are melted and shaped to form a pet chew treat.
4. (Currently amended) The resin formulation of Claim 1, wherein the shelf-stabilizing agent comprises ~~the a~~ a hydrolyzed protein.
5. (Original) The resin formulation of Claim 4, wherein the hydrolyzed protein is selected from the group consisting of hydrolyzed wheat gluten, hydrolyzed soy protein, hydrolyzed corn gluten, hydrolyzed potato protein, hydrolyzed rice protein, hydrolyzed gelatin protein, hydrolyzed collagen, hydrolyzed casein, hydrolyzed whey protein, hydrolyzed milk protein, hydrolyzed egg white, hydrolyzed egg yoke, hydrolyzed whole egg, hydrolyzed chicken liver, hydrolyzed pork liver, hydrolyzed beef liver, hydrolyzed fish liver, hydrolyzed meat protein of any source, hydrolyzed fish, hydrolyzed blood plasma, and mixtures thereof.

6. (Original) The resin formulation of Claim 4, wherein the hydrolyzed protein comprises hydrolyzed liver protein.
7. (Original) The resin formulation of Claim 4, wherein the amount of hydrolyzed protein ranges from 1% to 25 % by weight.
8. (Original) The resin formulation of Claim 4, wherein the amount of hydrolyzed protein ranges from 1.5% to 20 % by weight.
9. (Original) The resin formulation of Claim 4, wherein the amount of hydrolyzed protein ranges from 2% to 15 % by weight.
10. (Original) The resin formulation of Claim 1, wherein the shelf-stabilizing agent comprises the hydrolyzed protein derivative.
11. (Original) The resin formulation of Claim 10, wherein the hydrolyzed protein derivative comprises a reaction product of a protein hydrolysate with at least one reagent selected from the group consisting of an anhydride, ethylene oxide, propylene oxide, fatty acid, reducing sugars, maltodextrin, oligosaccharide, and dextrin.
12. (Original) The resin formulation of claim 11, wherein the hydrolyzed protein derivative contains from 0.5% to 50% hydrolyzed protein by weight of the reaction product.
13. (Original) The resin formulation of Claim 11, wherein the hydrolyzed protein derivative is a derivative of liver protein hydrolysate.
14. (Original) The resin formulation of Claim 10, wherein the hydrolyzed protein derivative ranges from 1% to 25 % by weight of the resin formulation.
15. (Original) The resin formulation of Claim 10, wherein the hydrolyzed protein derivative ranges from 1.5% to 20 % by weight of the resin formulation.
16. (Original) The resin formulation of Claim 10, wherein the hydrolyzed protein derivative ranges from 2% to 15 % by weight of the resin formulation.

17. (Withdrawn) The resin formulation of Claim 1, wherein the shelf-stabilizing agent comprises the hydrolyzed protein /hydrolyzed protein derivative-emulsifier complex.

18. (Withdrawn) The resin formulation of Claim 17, wherein the hydrolyzed protein /hydrolyzed protein derivative-emulsifier complex comprises hydrolyzed protein/hydrolyzed protein derivatives contacting an emulsifier selected from the group consisting of hydrolyzed vegetable oil, hydrolyzed animal fat, hydrolyzed lecithin and their salt forms, hydrolyzed lecithin modified further by ethylene oxide and propylene oxide, ethoxylated mono- and diglycerides, diacetyl tartaric acid ester of mono-diglycerides, sugar esters of mono- and diglycerides, propylene glycol mono- and diesters of fatty acids, calcium stearoyl-2-lactylate, lactic stearate, sodium stearoyl fumarate, succinylated monoglyceride, sodium stearoyl-2-lactylate, polysorbate 60, or any other emulsifier that contains both hydrophobic and hydrophilic portions in the structure, and mixtures thereof.

19. (Withdrawn) The resin formulation of Claim 18, wherein the emulsifier ranges from 10%-30 % by weight of the hydrolyzed protein /hydrolyzed protein derivative-emulsifier complex.

20. (Withdrawn) The resin formulation of Claim 16, wherein the hydrolyzed protein/hydrolyzed protein derivative-emulsifier complex contains a liver protein hydrolysate.

21. (Withdrawn) The resin formulation of Claim 16 wherein the hydrolyzed protein /hydrolyzed protein derivative-emulsifier complex ranges from 1% to 25 % by weight of the resin formulation.

22. (Withdrawn) The resin formulation of Claim 16 wherein the hydrolyzed protein /hydrolyzed protein derivative-emulsifier complex ranges from 1.5% to 20 % by weight of the resin formulation.

23. (Withdrawn) The resin formulation of Claim 16, wherein the hydrolyzed protein /hydrolyzed protein derivative-emulsifier complex ranges from 2 to 15 % by weight of the resin formulation.

24. (Original) The resin formulation of Claim 4, wherein the hydrolyzed protein moiety has a weight average molecular weight less than or equal to 20 KDa and a number average molecular weight less than or equal to 10 KDa.

25. (Original) The resin formulation of Claim 10, wherein the hydrolyzed protein moiety has a weight average molecular weight less than or equal to 20 KDa and a number average molecular weight less than or equal to 10 KDa.

26. (Withdrawn) The resin formulation of Claim 17, wherein the hydrolyzed protein moiety has a weight average molecular weight less than or equal to 20 KDa and a number average molecular weight less than or equal to 10 KDa.

27. (Original) The resin formulation of Claim 1, wherein the grain-based protein is selected from the group consisting of wheat gluten, corn gluten, soy protein, and mixtures thereof.

28. (Original) The resin formulation of Claim 1, wherein the grain-based protein comprises wheat gluten.

29. (Original) The resin formulation of Claim 1, wherein the grain-based protein ranges from 20% to 80 % by weight of the resin formulation.

30. (Original) The resin formulation of Claim 1, wherein the grain-based protein ranges from 30% to 75% by weight of the resin formulation.

31. (Original) The resin formulation of Claim 1, further comprising a plasticizer ranging from 10% to 40 % by weight of the resin formulation.

32. (Original) The resin formulation of Claim 31, wherein the plasticizer is selected from the group consisting of glycerol, diglycerol, propylene glycol, triethylene glycol, urea, sorbitol, mannitol, maltitol, hydrogenated corn syrup, polyvinyl alcohol, polyethylene glycol, and mixtures thereof.

33. (Original) The resin formulation of Claim 1, further comprising water ranging from 5% to 12 % by weight of the resin formulation.

34. (Original) The resin formulation of Claim 1, further comprising a lubricant ranging from 0.5% to 5 % by weight of the resin formulation.

35. (Original) The resin formulation of Claim 34, wherein the lubricant is selected from the group consisting of glycerol mono/di-stearate, hydrolyzed lecithin, hydrolyzed lecithin derivatives, fatty acid, fatty acid derivatives, and mixtures thereof.

36. (Original) The resin formulation of Claim 1, further comprising a mold release agent ranging from 0.5% to 3 % by weight of the resin composition.

37. (Original) The resin formulation of Claim 36, wherein the mold release agent is selected from the group consisting of magnesium stearate, calcium stearate, barium stearate, alkaline earth metal fatty acids, and mixtures thereof.

38. (Previously Presented) The resin formulation of Claim 1, further comprising a reducing agent ranging from 0.01% to 5% by weight of the grain protein.

39. (Original) The resin formulation of Claim 38, wherein the reducing agent is selected from the group consisting of alkali metal sulfites, ammonium sulfites, bisulfites, metabisulfites, nitrites, mercaptoethanol, cysteine, cysteamine, sulfur dioxide, ascorbic acid and mixtures thereof.

40. (Original) The resin formulation of Claim 38, wherein the reducing agent comprises sodium metabisulfite.

41. (Original) The resin formulation of Claim 1, further comprising an additional ingredient ranging up to 75% by weight of the resin formulation.

42. (Previously Presented) The resin formulation of claim 41, wherein the additional ingredient comprises:

a filler including at least one of a native or chemically modified starch, calcium carbonate, heat denatured protein, vegetable powder, rice flour, wheat flour, and corn gluten meal.

43. (Previously Presented) The resin formulation of claim 42, wherein the additional ingredient comprises the native or chemically modified starch in granular form, further selected from the group consisting of wheat starch, corn starch, potato, rice, tapioca starches, and mixtures thereof.

44. (Previously Presented) The resin formulation of claim 42, wherein the additional ingredient comprises the chemically modified starch as a reaction product of native starch by oxidation, acetylation, carboxymethylation, hydroxyethylation, hydroxypropylation, alkylation, and mixtures thereof.

45. (Withdrawn) The resin formulation of claim 42, wherein the additional ingredient comprises the filler including the fibers, further selected from the group consisting of cellulose fiber, micro-crystalline fiber, soluble fibers, wheat bran, soy bean fiber, corn grit fiber, and mixtures thereof.

46. (Withdrawn) The resin formulation of claim 42, wherein the additional ingredient comprises the (b) pigments, further selected from the group consisting of titanium dioxide, carbon black, talc, calcium carbonate, and mixtures thereof.

47. (Withdrawn) The resin formulation of claim 42, wherein the additional ingredient comprises the (c) coloring agents, further selected from the group consisting of azo dyes, chlorophyll, xanthophyll, carotene, indigo, all the synthetic colors, natural coloring agents, and mixtures thereof.

48. (Withdrawn) The resin formulation of claim 42, wherein the additional ingredient comprises the (d) foaming agents, further selected from the group consisting of sodium bicarbonate, N_2 , CO_2 , and mixtures thereof.

49. (Withdrawn) The resin formulation of claim 42, wherein the additional ingredient comprises the (e) other special effect ingredients, further selected from the group consisting of breath enhancers and dental cleaning ingredients.

50. (Original) The resin formulation of Claim 41, wherein the additional ingredient comprises a granular starch.

51. (Original) The resin formulation of Claim 50, wherein the granular starch is selected from the group consisting of corn starch, wheat starch, potato starch, rice starch, tapioca starch, and mixtures thereof.

52. (Original) The resin formulation of Claim 50, wherein the granular starch comprises a chemically modified starch.

53. (Original) The resin formulation of Claim 50, wherein the granular starch ranges from 0.001% to 70% by weight of the resin formulation.

54-73. (Cancelled).